

HISTORY OF AN OUTBREAK OF RHODESIAN SLEEPING SICKNESS IN THE UFIPA DISTRICT OF TANGANYIKA TERRITORY WITH SHORT NOTES ON CASES AND TREATMENT

BY

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I. INTRODUCTION

The outbreak to be described occurred in a portion of a large open forest, which is said to extend, with few breaks, over an area of 50,000 square miles. In the part surveyed the ground is for the most part gently undulating, though hilly in places; the average altitude is about 3,000 feet above sea level. The type of forest is that generally known as 'Miombo,' though true Miombo is only one of the many species of trees present. The forest affords light shade and it is rare to meet with much undergrowth.

Only two rivers of size traverse the area, namely, the Rungwa, with its tributaries, the Lugombe, Wogo, etc., and the Ugalla or Shama. These rivers, which are several hundred yards wide in the height of the rains, are reduced to series of stagnant pools towards the end of the dry season. During this season these pools form practically the only natural water supply of the area. Certain of these pools abound in fish which forms an important source of native food supply.

The people live in small scattered clearings where the soil is fertile and water supply easily obtained. These clearings are frequently only a few acres in extent. A fifty-acre clearing is considered a large one, and half a square mile is exceptional.

'A village' may consist of anything from one to forty, rarely more, houses; an average village consists of five to ten.

Only one species of tse-tse was met with, viz., *G. morsitans*. This fly, which is scanty except at certain centres, from about the middle of the dry season (August-September) to the beginning of the rains (November-December), is practically co-extensive with the forest towards the end of the rains and the beginning of the dry season (May-June).

Other biting flies met with were several species of *Tabanus*, *Haematopota*, and, in some places, *Chrysops*.

Game is fairly abundant, the commonest being—Eland, Roan, Bush-Buck, Oribi and other small buck, Baboons, Zebra, Giraffe, Bush-pig and Wart-hog; and in some places, Sable, Lesser Kudu, Water-buck, Buffalo, and Elephant. Leopards and Hyaenas are also common.

Those most frequently met with near human habitations are: Roan, Bush-buck, Oribi and allied species, Bush-pig, Wart-hog, Baboons.

II. THE HISTORY OF THE OUTBREAK

Whether the disease has been endemic for an indefinite period or whether it is of recent introduction is uncertain. The natives, almost unanimously, regard it as a new disease, stating that it had its starting-point at Tumbu (E_3 , A6), whence it radiated to other parts of the district. On the other hand, in the absence of a survey,—and no record of such a survey has been found—sporadic cases could easily occur, unrecognised. It is a common experience to find natives confusing Sleeping Sickness with other diseases, particularly with Ankylostomiasis—a disease which is endemic in the district.

The question of endemicity, then, still remains open; on the other hand, the present high incidence appears to be something entirely new. Apart from the natives' insistence on its being a new disease, it will be seen later that the level—or anything approaching it—of this incidence could not be maintained for many years without depopulating a whole country-side.

The recent history is fairly clear. It is known that deaths occurred from a disease, characterised by swelling of the legs, as early as 1915, in the vicinity of the Mtäte River (E_3 , A6 and 11), but the information is vague and it may or may not have been an early

manifestation of the present outbreak. Nothing more is definitely known until in 1920, or 1921, a fatal disease established itself at Tumbu. This disease was characterised by emaciation, swelling of the legs, and fatal termination. There were said to have been sixteen families in Tumbu before the infection came; within a year all these either died or escaped to neighbouring villages.

The next village to be attacked was Kilundu (E_3 , A11) and it suffered a similar fate. Some time later cases occurred at the group of settlements at Simbo (E_2 , D12). Here the havoc was not so complete and a large proportion of the population still remains. There appear to have been cases in Simbo early in 1924, and two cases from its vicinity were found positive in January, 1925.

On the northern side of the Rungwa River the first village known to be involved was Ilundu (E_2 , D8d), which, apparently, had a good deal of intercommunication with Tumbu. In the course of a year or so, at least ten people (probably not all Sleeping Sickness) out of a population of forty or fifty died. The remainder took refuge elsewhere, at Ilola (E_2 , D8 and E_3 , A5), Katutu (E_3 , A5), Isote (E_3 , A1), and, possibly, other places.

Among those who died at Ilundu was a woman who used to live at Tumbu: she left there for Ilundu, with symptoms of Sleeping Sickness, when Tumbu was evacuated. One at least of the refugees from Ilundu is stated to have died at Ilola, with symptoms of Sleeping Sickness. Whether this was the first case at Ilola, or when the first case occurred is uncertain, but, apparently, not later than 1923.

About the same time cases occurred at Mbao's (E_2 , D8). In that year or early in 1924 two deaths from the same disease occurred at Ilinga (E_3 , A2). One of these was a native of Ilinga, who developed symptoms after a visit to relatives in Ilola, while the other was a refugee from the latter place.

At what date the disease reached Mwanda (E_2 , D11 and 12) is uncertain, but it was well established both there and at Kianga's (E_2 , D8) by April, 1924. Later it reached Itetemya (E_2 , D7), Hatagelo (E_2 , D8), Kasamia's (E_2 , D7), and Chandarua's (E_2 , D11). Apparently there was constant intercommunication between these different settlements, and ample opportunities for infection by direct or indirect transmission.

During these months of 1924 the disease reached epidemic

proportions. At Iloa, of about thirty-five or thirty-six families living in 1923, only eight were left in November, 1924; at Mwanda only two out of sixty-four or sixty-five; while Kianga's, with one family, and Mbaos, with eight families, were completely depopulated.

What proportion died is uncertain, but it is stated that the majority did so and that only a small minority escaped.

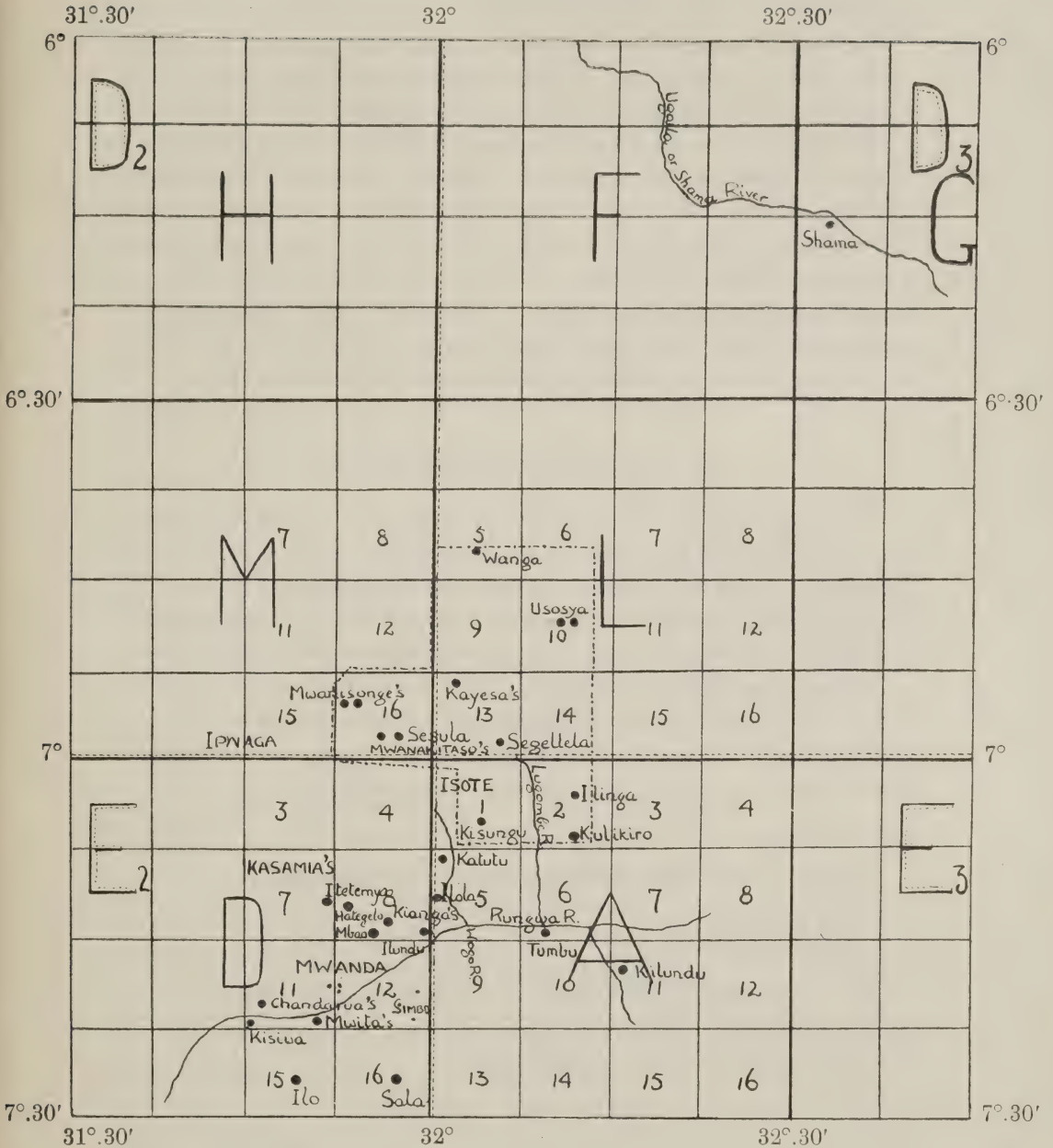
A number of the now panic-stricken refugees went Northward to Isote (E₃, A1), Kisungu (E₃, A1), Mwanakitaso's (E₃, A1, etc.) and elsewhere. Others from Chandarua's went South of the Rungwa River to Mwita's (E₂, D11) and Bigiri's (E₂, D) and some of the refugees became ill at both these places. Subsequently some of the inhabitants of Mwita's became sick and two of these sick removed to Kisiwa (E₂, D 11) where they were found suffering from Sleeping Sickness, in 1925.

Of the refugees who went North some became ill at Kisungu and other places. Natives of Kisungu now became infected and were found suffering from Sleeping Sickness late in 1924. At Ilinga, a few miles away, cases had occurred as already stated. Quite apart from the fact that there must have been many refugees whose movements are unknown, there was enough intercommunication between the places above mentioned and their neighbours to account for the cases that subsequently occurred in the surrounding villages (see map).

The next important stampede occurred from Ilinga in the latter part of 1924. After the deaths of four or five people in the course of a few months (some of them apparently not Sleeping Sickness), a large number of the people fled, some to neighbouring settlements like Mwanakitaso's and Kulikiro (E₃, A2), others further afield to Ilo (E₂, D15), Shama (D₃, G9), Kiwere (D₃, N10), etc. Some of these refugees were subsequently found suffering from Sleeping Sickness at Mwanakitaso's, Kulikiro, Shama, and Ilo. Some time before this stampede some persons from Sala (E₂, D16) visited Ilinga at different times (possibly passing through infected villages on the way), and on returning home developed Sleeping Sickness.

Survey was commenced in November, 1924. The history prior to that date is based almost entirely on native information collected between November, 1924, and January, 1926. Cases of Sleeping

UFIPA SLEEPING SICKNESS AREA.



Scale— $\frac{1}{4}$ -inch = 10 miles.

● = Settlements.

----- = Sultan Baula's Boundary.

March, 1926.

Sickness mentioned above, which occurred after the commencement of the survey were, in almost every instance, diagnosed microscopically.

Outbreaks occurred at the same time in other parts of the same forest, but as a connection between them and this has not, so far, been definitely established, they are not included in this paper.

The history has been given in some detail because it appears to show the importance of the human agent in spreading the disease when the incidence is high. Cases have occurred which could not be traced to a human infected focus, but it is not improbable that a more thorough knowledge of their movements would elicit a connection with a human source. The history also illustrates the devastation that can be made in a sparse population by this form of Sleeping Sickness before it undergoes spontaneous arrest.

III. CAUSES OF THE OUTBREAK

These are unknown but certain disturbing factors may be mentioned. The most important of these appear to be the late War and Influenza. First the former and then the latter led to considerable disorganisation and movements of the population. No aetiological influence, however, has been conclusively traced to either of them.

Shortage of food is of almost annual occurrence in some part or other of the forest and what influence it may have had is more likely to have shown itself in helping to propagate an established disease than in paving the way for a new outbreak.

IV. THE INCIDENCE OF THE DISEASE

The following figures are based on observations made in the Baula Sultanate (excluding Ipwaga) with a few neighbouring villages which, geographically, form part of it, the whole occupying an area of 500 square miles. This was the part most thoroughly surveyed, and, possibly, also that most heavily infected.

Settlement	Estimated population, November, 1924	No. of positive cases between November, 1924, and 31st December, 1925
Ilinga	34	12
Kayesa's	50	2
Mwanesonge's	33	3
Mwanakitaso's	60	21
Segellela	61	1 (a refugee)
Sesula	80	7
Usoya	90	5
Wanga	33	0
Kisungu	28	8
Kulikiro	23	3
Mtalaza	21	0
Other villages	50	1
TOTAL	563	62 (excluding 1 refugee)

Highest incidence in one settlement, 35 per cent.

Incidence for Sultanate, 11 per cent.

(These 'Settlements' are groups of villages in many instances separated by forest.)

V. DIAGNOSIS

Rhodesian Sleeping Sickness is based—

(a) On the comparative acuteness of the disease, the duration of untreated cases being usually not longer than about six months.

(b) The finding of 'posterior nuclear forms' in an infected rat.

VI. THE EARLY STAGES OF THE DISEASE

The following case may be of interest as illustrating the earliest stages from the probable time of infection.

The patient, a personal boy, lived at the coast (Dar-es-Salaam) before entering the tse-tse forest, and so far as is known had not been near an endemic locality for years.

He entered the tse-tse forest on 1st November, 1924, and reached the vicinity of an infected village for the first time on 11.11.24. He remained in good health till 21.12.24, in the meantime doing his ordinary work and frequently doing long marches.

On 21.12.24 he became acutely ill with fever and general malaise.

On 22.12.24 his condition was unchanged; trypanosomes were found in his blood.

On 23.12.24 he had pain in the side of the chest and cough, but no physical signs in chest.

On 25.12.24 he was improved but had anorexia.

4.1.25. Gradually improving and appetite returning. Walking about a little. Trypanosomes again found in the blood.

Glands not enlarged except axillary which were distinctly palpable.

Treatment with 'Bayer 205' commenced.

'Bayer' in 1.2 grm. doses was repeated on 10th and 29th days, all intramuscularly. He had vomiting and diarrhoea and, subsequently, an abscess after his first injection, but after his second he made a rapid and uninterrupted recovery.

He took up his ordinary duties again on 1.4.25.

Subsequently he remained in excellent health, doing strenuous work almost continuously, until January, 1926, when he unfortunately sustained a fatal injury.

VII. TREATMENT

(I) 'BAYER 205.'

Of twenty-seven cases treated between November, 1924, and March, 1925, fourteen still (March, 1926) survive, eight of them having remained in good health, without further treatment, since December, 1924. One of these eight was ill for two months, the other seven—with the possible exception of one, who did not give a clear history—were early cases, symptoms being of one month's duration or less before treatment was commenced.

All relapsed cases still surviving—with the possible exception of one, who did not give a clear history—were more advanced cases who had symptoms for two or more months before commencing treatment. Two of these relapsed cases are now in good health after Tryparsamide treatment.

One more case was alive, but with parasites in his blood, in December, 1925. He has not been treated since.

Of twelve cases that died, six only had a full course of treatment—a full course being three to four, or more, injections in 1·1-1·2 gramme doses for adults, and proportionately small doses for children—the other six who died did so either before the course could be completed, or after having, for various reasons, discontinued treatment. Of the six fully-treated, three had symptoms for two or more months before commencing 'Bayer'; the other three—two of whom were children under ten years—had symptoms for about a month. (Two of the three advanced cases had a further course of 'Bayer,' which resulted in temporary improvement.)

One case not included in the above series, who commenced treatment a fortnight after onset of symptoms, remained in excellent health for a year, when he sustained a fatal injury (see para. 6).

Period Intervening Before Relapse. Symptoms, with negative blood, were met with as early as four months after completion of treatment. In other cases parasites were found in the blood, without symptoms, nine months after completion of treatment. (As these cases were not under continuous observation, parasites may have been in the blood much earlier than was observed.)

When 'Bayer' is used for sterilisation of the blood in advanced cases it must be remembered that trypanosomes may re-appear long before there is any definite clinical evidence of relapse, and as the parasites are still, presumably, infective, these cases may become a source of danger to others unless re-sterilisation of the blood is effected.

Toxic Effects of 'Bayer.' Albuminuria is a frequent sequel, but, in its immediate effects at least, not usually serious.

The following case suggests that the drug may, sometimes, affect the skin.

The patient, a young man, commenced treatment with 'Bayer' about a month after onset of his symptoms.

1.12.24. 1·2 grm. 'Bayer' was given intramuscularly.

14.12.24. 1·2 grm. 'Bayer' was given intramuscularly.

31.12.24. Reported with a vesicular rash over face, trunk, and limbs, and a diffuse stomatitis. Rash was said to have been present a few days only. Specimen of urine was not obtained.

15.1.25. Improved. Trace of albumen in urine.

25.1.25. Large amount of albumen in urine. Rash and stomatitis almost subsided.

Albuminuria persisted till February, 1925, but there was no recurrence of rash. Case was then lost sight of for some months.

Another series of cases treated during the latter part of 1925 is under observation.

(2) TRYPARSAMIDE.

Of two cases, both women, who commenced treatment, 3 grammes every week, for eight weeks, in November, 1924, one is still well. Her blood remained negative till March, 1925, when she was temporarily lost sight of. Seen again in December, 1925, parasites were found in the blood, though the patient was in fairly good health and working regularly. Another course of treatment was then given.

The other case whose blood was negative after the first injection showed parasites again after the eighth. She died of Pneumonia shortly after completing her course of treatment. (In these two cases boiled solutions of the drug were used in the last two injections.)

A third case, treated in December, 1924, died suddenly a few days after her second injection.

A fourth case, in whose blood parasites were found only after frequent and prolonged searches, had his blood swarming with trypanosomes seven days after an injection of 4 grammes of Tryparsamide. He subsequently improved but did not complete a regular course of treatment.

Of a series, subsequently tried with boiled solutions of the drug, the majority died before completing a course. A few did well, temporarily, remaining in good health for several months. These last were cases in which the disease was mild.

(3) It is not yet possible to make a fair comparison between 'Bayer 205' and Tryparsamide.

The latter, besides being unstable to high temperatures, and apparently, to certain filtered waters, requires more investigation on several points. For instance, the total dosage, which ordinarily is 24-32 grammes, may have to be considerably increased or, it may be, the best results may be obtained by combining it with another drug.

'Bayer 205' and Tryparsamide combined are now being tried in a series of cases.

VIII. ACKNOWLEDGMENTS

I am indebted to Mr. G. W. Hatchell, Administrative Officer i/c Ufipa District, for collecting a mass of information bearing on the history of the outbreak. But for his assistance large gaps in the history would still remain unfilled ; to Dr. J. Williamson, for completing treatment in a number of cases and keeping others under observation ; to Dr. G. S. Park Noble, for reporting on cases from January to March, this year.

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